



DoD Innovation and Preparing to Test These Capabilities

31st Annual National Test & Evaluation Conference

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DoD Tech Superiority



- **For over 40 years US and Allies counted on tech superiority**
- **What has changed:**
 - Global access to resources, technology and talent
 - Competitors investing in capabilities which counter US advantage
 - Response requires agility and keeping up with technical opportunity
 - Focus on cost and cycle time
- **Our response, competitive advantage through innovation...**
 - Leveraging all sources of innovation opportunity:
 - Time to market matters – Accelerate the Technology Adoption Cycle
 - Speed transition from Laboratory to Fleet
 - Innovation enables Strategy





DoD Technology Offset Strategies



- **Past: “First Offset Strategy” – Nuclear**
 - Emphasis on **nuclear deterrence** to overcome the numerical advantages of Warsaw Pact
- **Current: “Second Offset Strategy” – Precision/Stealth**
 - Emphasizes **advanced targeting** and **precision weapons** to overcome the numerical advantages held by U.S. adversaries (more “bang for the buck”)
 - Examples: GPS, ISR platforms, Space-based Comms, Precision-Guided Weapons; Deep Strike Weapons; and Stealth
- **Future: “Third Offset Strategy” – Speed**
 - Faster Weapons: Hardened to operate in communications-denied environments
 - Faster Decisions: Human-machine collaborative decision making
 - Faster Reactions: Autonomous learning systems to respond faster-than-human
 - Faster Coordinated Attacks: Advanced manned-unmanned system operations
 - Faster to Market: An important aspect of speed



Focus on Prototyping and Rapid Fielding

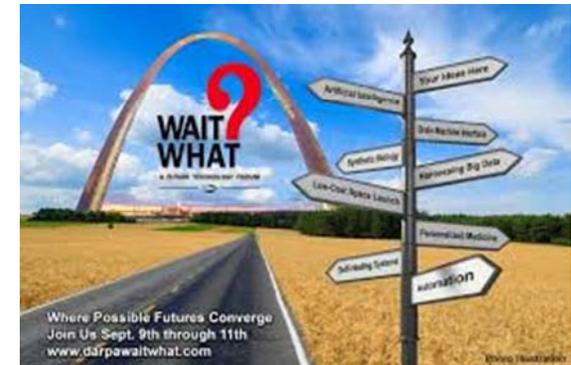


- **Strategic Use of Prototyping**

- Hedge against technical uncertainty, emerging capabilities, or unanticipated threats
- Enhance interoperability; reduce lifecycle cost; explore the realm of the possible
- Experiment with TTPs to select the most appropriate opportunities/options

- **New approaches**

- Evaluate concepts, guide technology development
- Sustain the defense industrial base
- Simulate design to advance the state of the practice
- Improve development methods and manufacturing
- Promote open standards, and competition
- Determine maturity using sound DT&E practices (e.g. DEF)



- **Accelerate technologies, products, concepts to the warfighter**

- With tested TTPs and potential operational concepts

Testing Characterizes Safety, Capabilities, and Limitations



TRMC Autonomy T&E Study



3 Phases	1. Study Autonomy T&E Infrastructure Requirements (Complete)	2. Identify T&E Infrastructure Solutions and Gaps (Starting soon)	3. Develop Time-Phased Investment Strategy
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Study Implications to Test Ranges

Needed Investments in test methodologies and infrastructure	
1	Expand test methods and approaches to evaluate trust requirements
2	Expand capabilities to generate and inject tracks/objects into live UxV SUT
3	Develop tests to uncover emergent behaviors
4	Develop toolsets to quantify the experience with knowledge based learning
5	Expand capabilities to capture, catalog, and re-use human and UxV behaviors
6	Develop red-team/blue-team and LVC test capabilities with live UxV SUT

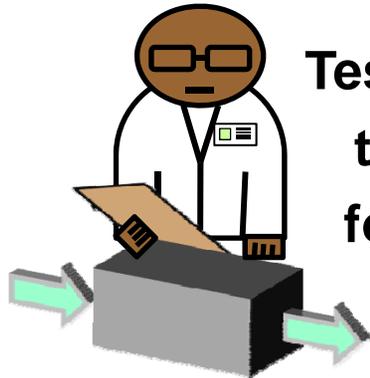




Testing Autonomy



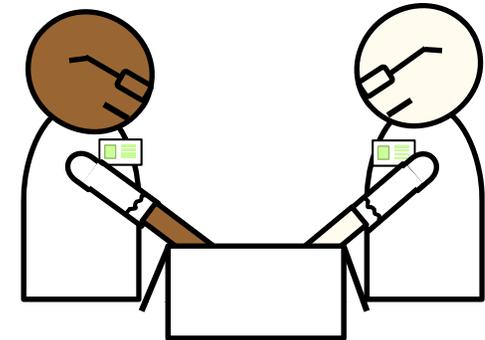
TESTER



Testers must be involved in “white box” testing to get the confidence needed for autonomous system employment

TESTER

DEVELOPER



- **Trusting autonomy means trusting sensors and software**
- **With only sensor and software output**
 - Only the end response can be adjudicated
 - Requires significantly more testing to achieve **trust** in a system
- **With insight of sensor performance and hooks into software processing**
 - **Trust** of the system comes more quickly and more affordably.

Testers as members of the development team facilitates program's timely success



Sustainability Challenges



- Inability to stop energy development near MRTFB facilities
- Pending legislation has limiting effects
- Gulf oil and gas moratorium ends in 2022
- Long range strike weapons need more test space, not less
- Spectrum pressures from many directions - congress, business, etc.



UNITED STATES FREQUENCY ALLOCATIONS



Possible Encroachment to T&E Infrastructure and Ranges is Significant

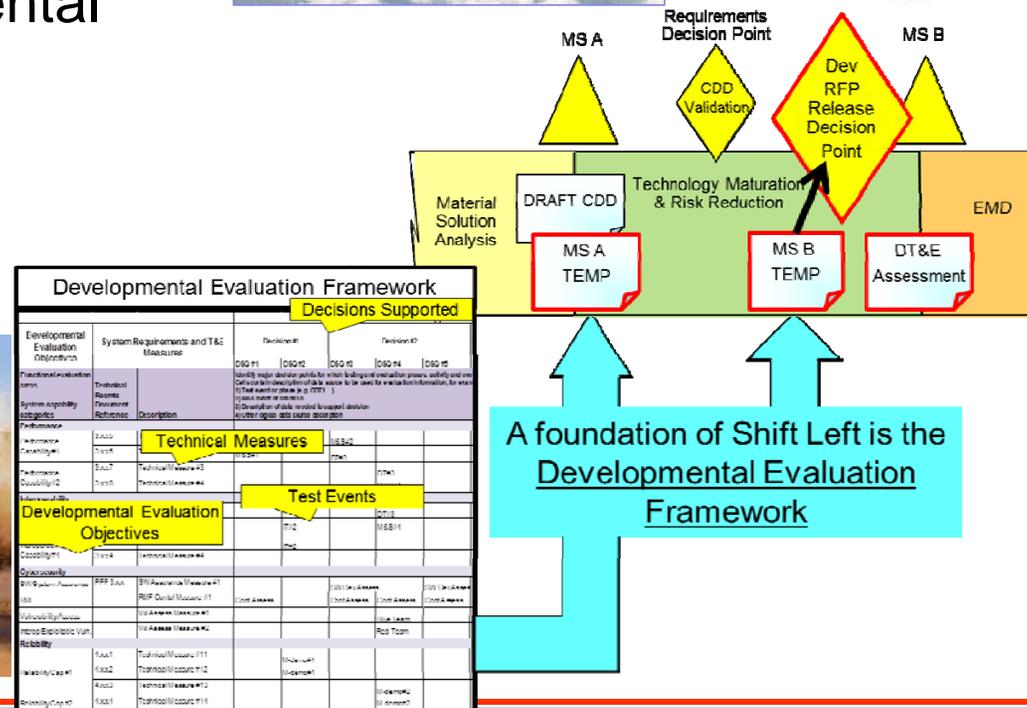


TRMC and DT&E Program Support Initiatives



Test Planning efficiency and effectiveness

- Improve TRMC/DT&E collaboration
- Emphasize Shift Left
- Institutionalize the Developmental Evaluation Framework
- Implement the TEMP at MS A
- Bring big data and knowledge management into T&E





TRMC and DT&E Program Support Initiatives



Professionalism and collaboration

- Advocate for the T&E Workforce
- Improve support to PMs, Chief Developmental Testers and Industry Test Leads
- Flexible Aviation Classroom Experience (FLEX-ACE)



THE DoD ACQUISITION, TECHNOLOGY, AND LOGISTICS
KEY LEADERSHIP POSITION JOINT QUALIFICATION BOARD
HAS DETERMINED

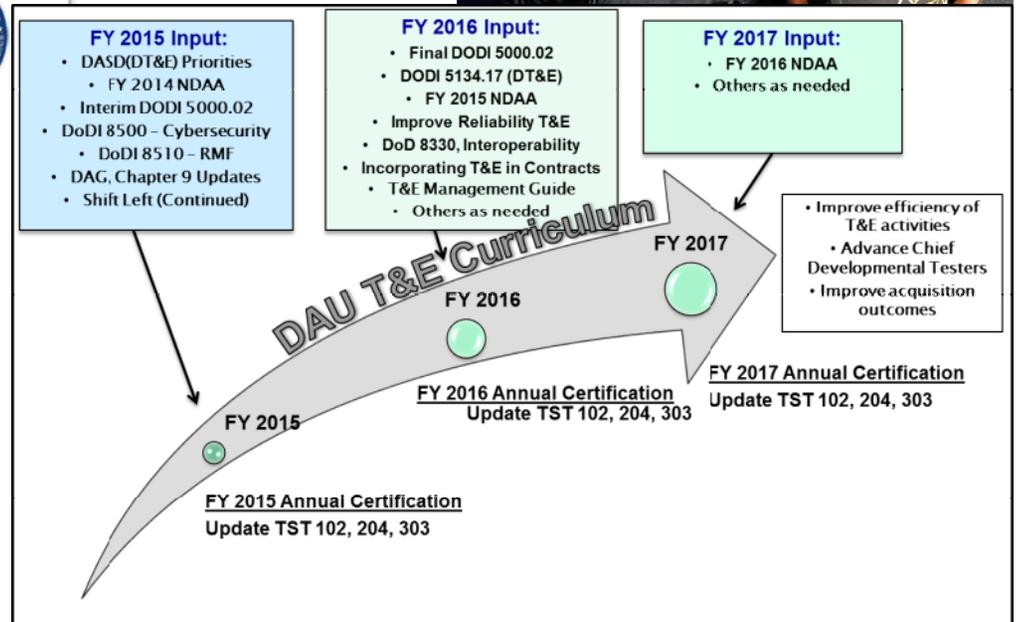
Joe Tester

HAS DEMONSTRATED THE QUALIFICATIONS NECESSARY TO FILL THE
KEY LEADERSHIP POSITION
OF
Chief Development Tester

The Honorable Frank Kendall III
Under Secretary of Defense
(Acquisition, Technology, and Logistics)

Date

Improving the Professionalism of the Total Acquisition Workforce





New Positions in Test Leadership



- Chief Developmental Tester...a KLP at the PMO...
- Lead Developmental Test and Evaluation Organization
- Industry Test Lead



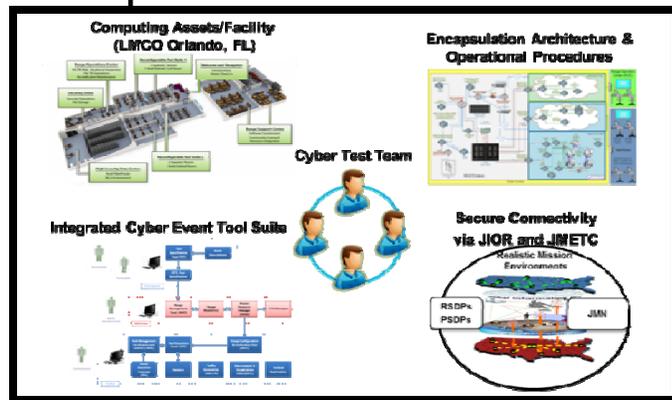
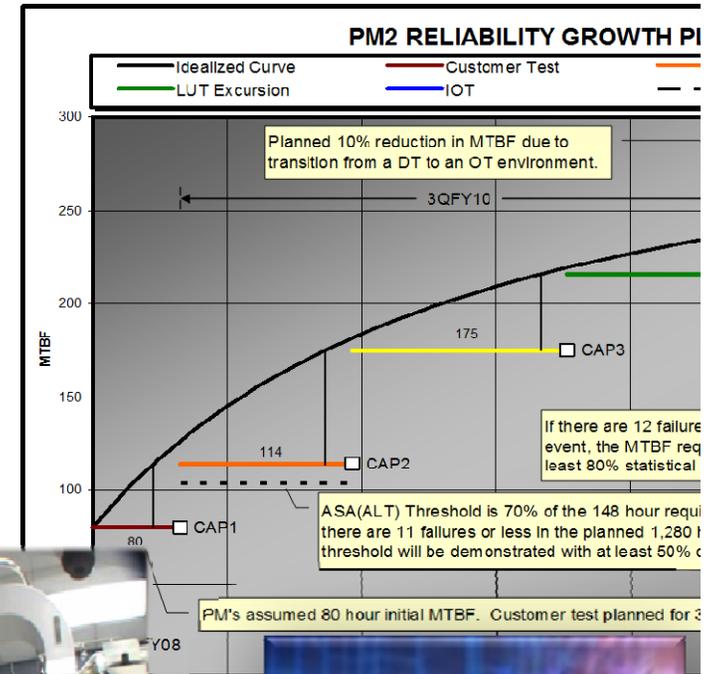


TRMC and DT&E Program Support Initiatives

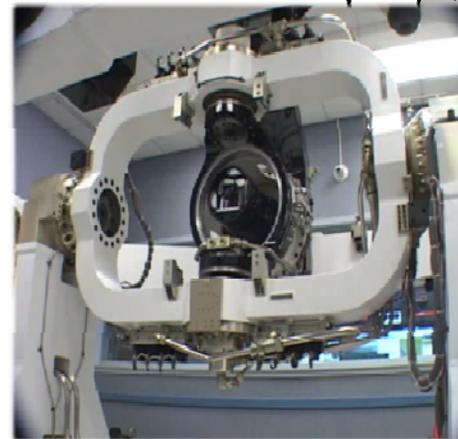


Specialty engineering - T&E improvement

- Improve reliability T&E
- Improve cyber T&E and cyber test capability
- Improve Interoperability T&E
- Improve/maintain the hypersonic test infrastructure
- Understand/improve T&E of autonomous systems
- Improve Mission Context in DT



NCR





No Innocent By-Standers in the Cyber World



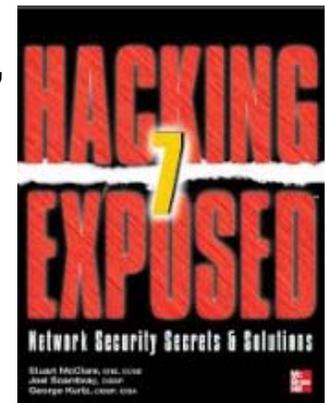
- **Assertions:**

- The most advanced technologies in DoD go thru the T&E infrastructure (S&T, Development, System's Acquisition and System Sustainment)
- Defense T&E facilities remain prime intel targets (Exfiltration of Information)
- Cyber attacks on T&E capabilities could alter results (Disruption, False Negatives)

- **Security:**

- Physical and electronic emission concerns remain
- Cyber security – new stuff (Have we thought about it?)

- **How cyber secure are the test capabilities in the DoD and its contractors facilities?**



Poor Cyber Security at Test Locations can Negate the Best DoD Weapon Technologies



Scientific Test and Analysis Techniques (STAT) Program



- STAT Center of Excellence (COE) has provided SMEs to >43 programs to date
- STAT can provide more confidence with less testing
- The STAT COE and the use of STAT adds to Better Buying Power

More Rigor, More Efficient Testing, More Confidence



Congressionally Directed Analysis Rent vs Buy of Commercial Test, Research, and Measurement Capability

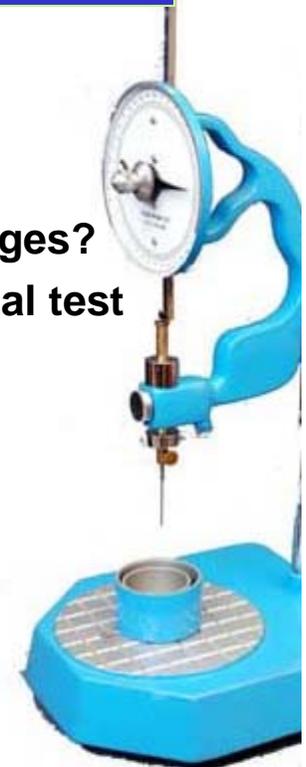


Senate Report 114-49: National Defense Authorization Act for FY 2016

“The Under Secretary of Defense for Acquisition, Technology and Logistics should conduct a review of the acquisition practices for acquiring Commercial Off-the-Shelf (COTS) research, test and measurement equipment and capabilities and report to the congressional defense committees not later than 120 days after the date of enactment of this Act.”

The Driving Questions:

- Are there policy impediments for “rent/lease vs buy”?
- Is the option to “rent/lease vs buy” being broadly implemented at the ranges?
- What mechanisms would the DoD test community use to lease commercial test equipment?





DoD Test and Evaluation Exhibit



Any artifacts to contribute?



DoD Test and Evaluation Exhibit



- **Present the DoD T&E Story**

- T&E Mission
- T&E History
- Five Warfighting domains
 - Land, Maritime, Air, Space, and Cyber
- T&E Awards (ITEA, NDIA and AOC)
- Fallen Testers

- **Location - Pentagon**

- 5th Floor - A Ring, Main Corridor (between Corridors 1 and 10) and Escalator enclosure

- **Presentation Methodology**

- Electronic Displays – running test videos and pictures
- Pictures, physical artifacts (unique, historical), written descriptions
- Large Map Displaying DoD Test Locations

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Test Enterprise Coordination Committee



- **Value of a persistent industry-government forum on test infrastructure reaffirmed through TRMC-sponsored 2014/2015 Defense Industry Forum (DIF) Collaborative Analysis Events**
- **NDIA T&E Division to host a new “Test Enterprise Coordination Committee”**
 - Regularly occurring forum to discuss test capabilities and resources, near and far-term needs and issues
 - To be held in DC area twice per year – Spring/Fall meetings
 - Meeting agenda to be jointly developed by NDIA and TRMC
 - Targeting May 2016 for initial kick-off meeting

**Special Thanks to NDIA’s Joe Manas and
MG(R) Barry Bates for Spearheading this Effort!**

